

feedstock from passing through the bypass apparatus until sufficient resistance is experienced and the disk ruptures.

In the Beal invention, upon pressure drop increase, the rupture disk would burst or a butterfly valve would be opened using an external lever to allow flow through the bypass apparatus.

[ In contrast, the present invention requires no such closure means or rupture disk. Unlike Beal, the invention allows flow thru the bypass apparatus even prior to fouling taking place. This flow automatically increases (without help from a closure means) as fouling occurs and pressure drop builds up. Hence, the claims have been amended to note that a majority, but not all of the feedstock passes through the top of the catalyst bed initially. Support can be found on page 8. Hence, whereas Beal prevents any amount of feedstock from bypassing the top of the catalyst bed until the bypass tube is opened following a degree of fouling, Applicants allow a minority of feedstock to enter the bypass tube even prior to fouling. ]

Several disadvantages of using a rupture disk or a valve would be apparent to a person with normal skills in the art. The rupture disk may fail to open or it may open prematurely (for example due to a temporary upset in the flow rate to the reactor). In addition, a large commercial reactor would require the use of multiple bypass apparatus with rupture disks or valves in each of them. Since, it is impractical to design all the rupture disks to burst open at precisely the same time, some of them will open early and some later. Bypassing in some rupture disks that have opened early will cause flow maldistribution in the catalyst bed which may cause operational problems like unsafe hot spots in the catalyst bed. If the rupture disks opened prematurely due to an upset, the reactor may require a shut down so that new disks could be installed. Similarly, if a valve is used, external levers would

need to be built to activate these valves. The present invention overcomes these shortcomings by eliminating the closure means of the bypass apparatus allowing flow through the bypass means at all times.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned, "Version with Markings to Show Changes Made".

Applicants contend that the invention is different from that of Beal and is in condition for allowance and respectfully request such favorable action.

Respectfully submitted,



Estelle C. Bakun  
Attorney for Applicant(s)  
Registration No. 35,054  
Telephone No. (908) 730-3634

☐ Pursuant to 37 CFR 1.34(a)

ExxonMobil Research and Engineering Company  
P. O. Box 900 / Clinton Township  
Annandale, New Jersey 08801-0900  
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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION**

**TITLE**

Please amend the title by deleting the original title in its entirety and replacing it with the following rewritten title: --A METHOD FOR EXTENDING OPERATING LIFE OF A FIXED BED REACTOR.--

**ABSTRACT**

Abstract (once amended). Please delete the abstract in its entirety and replace it with the following rewritten abstract:

--A method for extending the operating life of a fixed bed reactor for reacting a feedstock in which a feedstock is contacted with a fixed bed of catalytic material contained in the reactor.--

**IN THE CLAIMS**

9. (Amended). A method for [extending the] operating [life of] a fixed bed reactor for reacting a feedstock in which [a] the feedstock is contacted with a fixed bed of catalytic material contained in said reactor said fixed bed of catalytic material having a top and bottom layer, and wherein during operating of said fixed bed reactor, there is a pressure drop across said fixed bed of catalytic material, and wherein the pressure drop across said top layer of said fixed bed of cataly[st] tic material increases during reaction of said feedstock due to fouling of said top layer of said fixed bed of catalytic material, comprising the sequential steps of (a) introducing

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said [hydrocarbon] feedstock into said fixed bed of catalytic material, wherein a majority of said feedstock will flow through said top layer of said fixed bed of catalytic material and (b) as said top layer of said fixed bed of catalytic material fouts, bypassing an increasing amount of said feedstock to said bottom layer of said fixed bed of catalytic material.

10. (Amended). The method of claim 9 wherein said [hydrocarbon] feedstock is selected from the group consisting of liquid feed, vapor feed, and mixtures thereof.